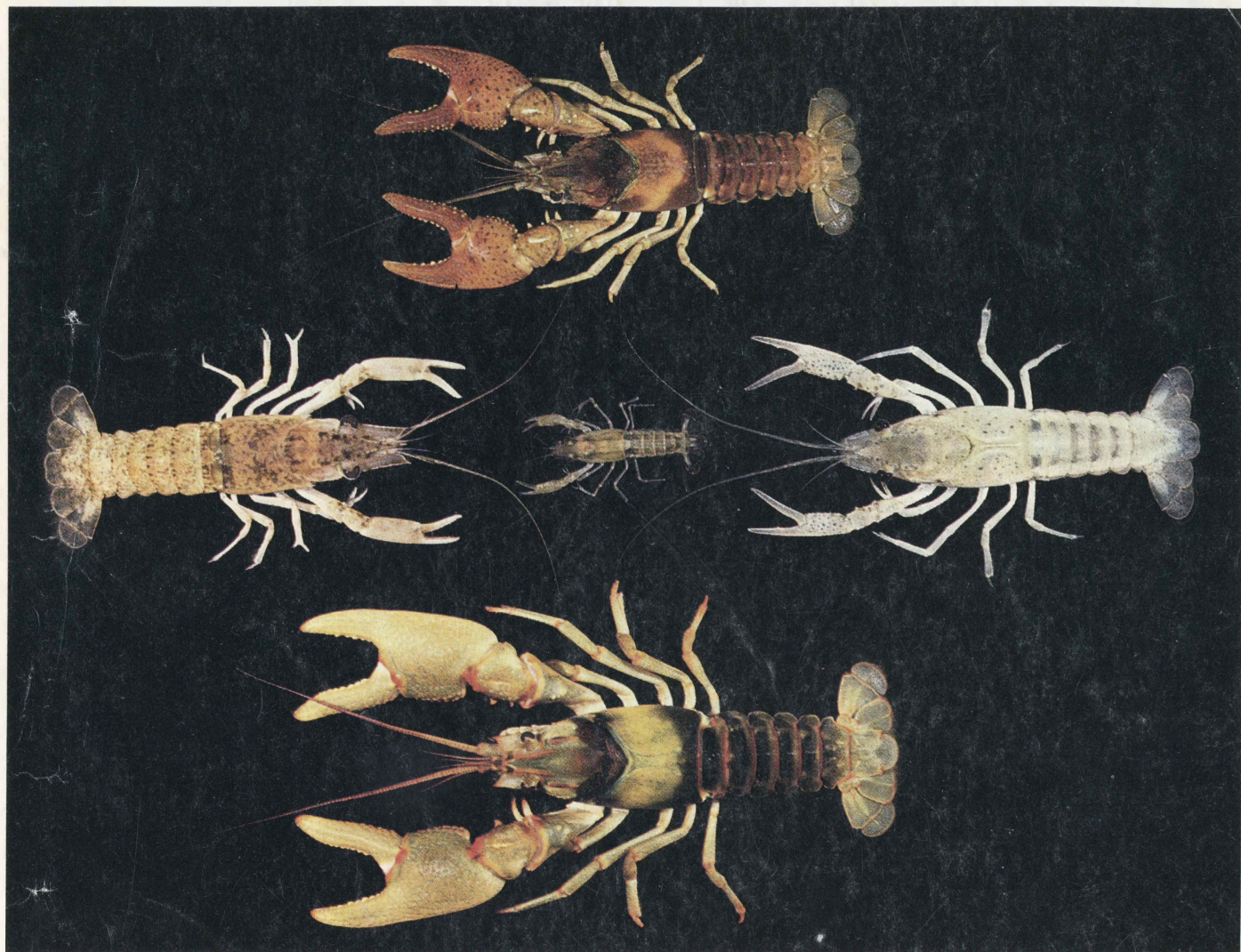


# An Introduction to the Crayfish of Missouri



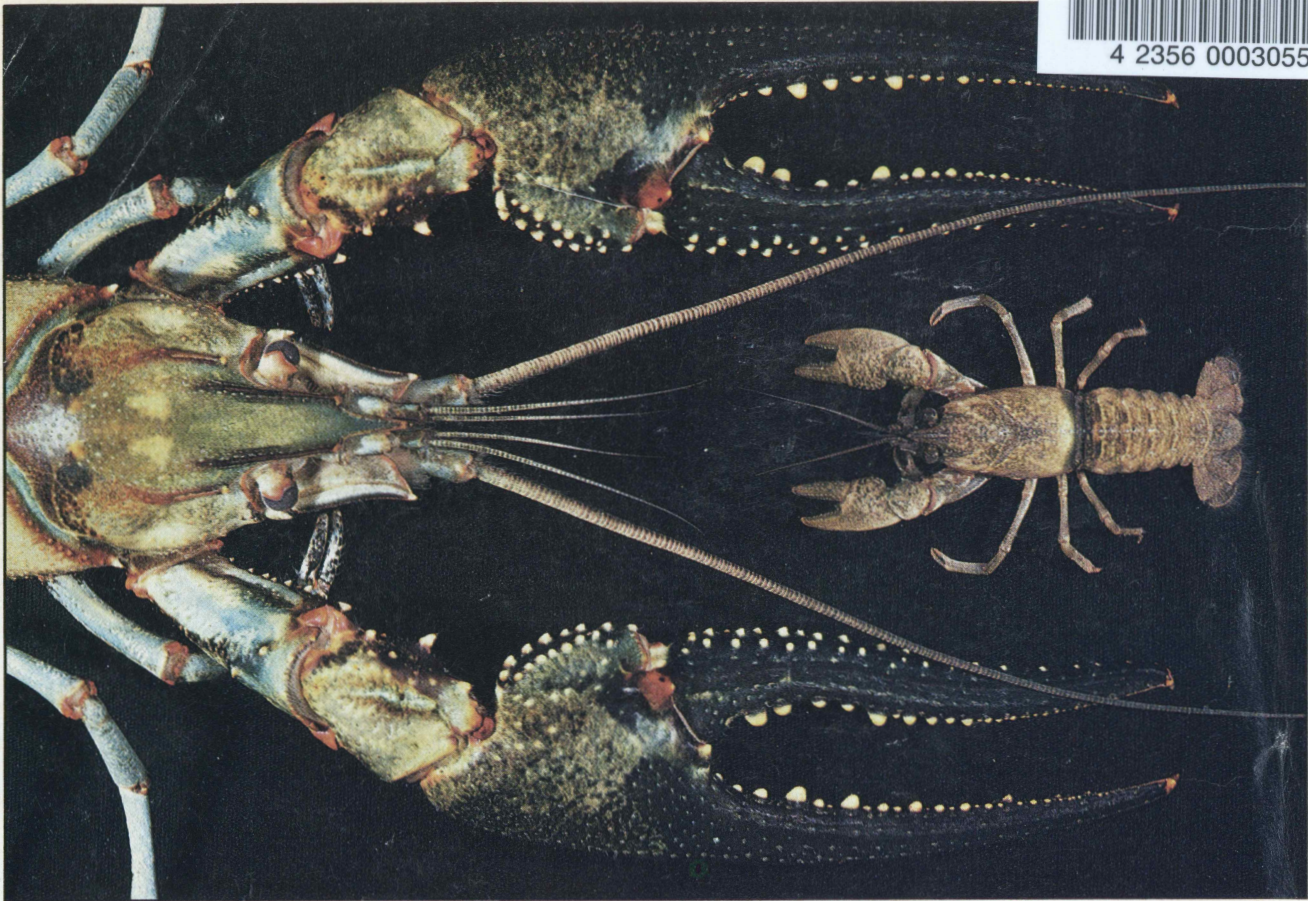
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Photos by author



**Missouri Department of Conservation**

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The largest and smallest crawdad species found in Missouri are the longpincered crayfish (*Orconectes longidigitus*, left) and the Neosho midget crayfish (*Orconectes macrus*, right).

**C**RAYFISH (also called crawfish and crawdads) are among the largest and most common invertebrates in Missouri's lakes and streams. They are an important food for many other animals and have long been popular as a fish bait. Crayfish are an important ingredient of Cajun cuisine. They have the same desirable nutritional qualities as other seafoods, and their popularity with health-conscious mid-westerners is increasing. This increasing popularity and the search for alternative crops as a result of the farm crisis is stimulating an interest in crayfish by Missouri farmers.

This article is written to better acquaint Missourians with these colorful, interesting and important animals by providing information on the kinds of crayfish that occur in our state, their distribution and how to identify them. The reader may also want to consult "Crayfish of Missouri" by Tom R. Johnson (*Missouri Conservationist*, July, 1978) for an introduction to the general biology of crayfish, and "Crayfish Clambake . . ." by Jim Auckley (*Missouri Conservationist*, September, 1975) for information on catching and cooking these animals. Studies now underway are providing new information on Missouri crayfish, and will lead to the publication of a more comprehensive handbook.

A major deterrent to the study and appreciation of crayfish by the nonspecialist is the difficulty in identifying them. The only identification aids currently available are highly technical keys that place heavy emphasis on slight differences in structures (gonopods) in mature males. Fortunately, Missouri crayfish have more readily observed features that can be used in determining the species. Also, many have definite and quite limited distributions, so that the number of species that need to be considered in making an identification from any given area is quite limited.

At first glance, most crayfish look pretty much alike, but closer study reveals that the species differ greatly in size, color and the proportional development of various body parts. These differences are in turn related to the diversity of habits that crayfish have adopted to find food, reproduce their kind and avoid being eaten by predators such as fish and birds.

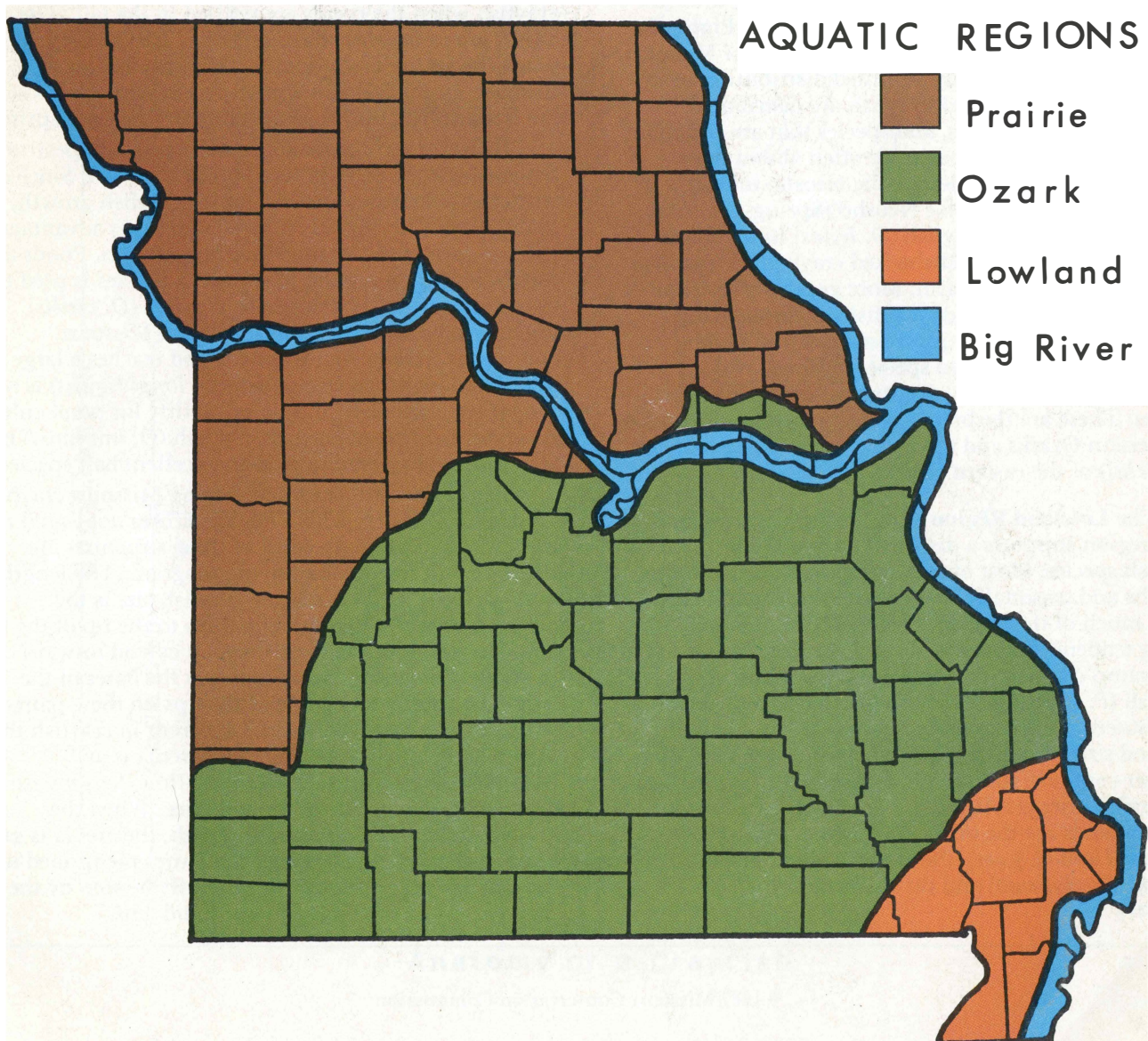
Let's compare two species of Missouri crayfish to illustrate these differences. The longpincered crayfish (*O. longidigitus*) is one of the larger North American species, achieving a length of six inches or more from the front of its head to the tip of its tail. In contrast, the Neosho midget crayfish (*O. macrus*) rarely exceeds two inches in the same dimension. The longpincered crayfish is olive-tan trimmed with bright red, and its

pincers are dark blue-green prominently studded with yellow knobs. The Neosho midget crayfish is a subdued mottled brown and black without bright markings or knobs. The difference in build between them suggests the difference between a bulldog and a greyhound: the stout build and short, heavy pincers of the Neosho midget crayfish contrast sharply with the more slender build and long, narrow pincers of its larger relative. The Neosho midget crayfish is bite-size for any goggle-eye or bass, and it avoids being eaten by burrowing in gravelly shoals with its powerful pincers. An adult longpincered crayfish can mount a formidable defense, and boldly prowls the bottoms of bass-laden pools at night in search of food.

The longpincered crayfish feeds on a variety of plant and animal materials, both living and dead—including other crayfish. However, the Neosho midget crayfish is definitely not on its menu, since these two species never occur together naturally. They occupy non-overlapping ranges in the southern Ozarks, with

the longpincered crayfish confined to the White River and its tributaries, and the Neosho midget crayfish occurring in the adjacent Spring and Elk River drainages.

Missouri has at least 32 species of crayfish, more than most neighboring states. Each species of crayfish occurs only in certain natural settings or habitats that reflect its special requirements; the diversity of crayfish that occur in our state results from the many types of aquatic habitats that are found here. Based on their habitats and requirements, crayfish can be divided into four broad categories: (1) crayfish living in surface streams (2) crayfish living in swamps, marshes and the shallows of ponds and lakes (3) crayfish living in burrows away from surface water and (4) crayfish living in underground streams. These categories overlap to a certain extent. For example, some species occur for much of the year in seasonally flooded pools, but burrow into the bottom as these pools dry up in summer.



Missouri is divisible into four principal aquatic regions, each with its own characteristic assemblage of crayfish. Although some species are found in more than one region and others have only a very local occurrence, the regions serve to identify the typical crayfish habitats and centers of abundance. These regions are shown on the accompanying map.

The **Prairie Region** is in north and west Missouri. This region supports a limited crayfish fauna of four common species. The prairie crayfish (*P. gracilis*), a burrowing species, inhabits grasslands and former grasslands, often at considerable distances from any surface water. Another burrower, the devil crayfish (*C. diogenes*), lives in timbered areas along the courses of streams. The northern crayfish (*O. virilis*) occurs in just about any prairie stream capable of supporting crayfish. In mud-bottomed streams and shallow sloughs it is joined by the papershell crayfish (*O. immunis*), and in rocky streams of the eastern prairies the golden crayfish (*O. luteus*) is present.

The **Ozark Region** is in south-central Missouri. The clear rocky streams of this region are the distribution center for 18 species of crayfish. Eight of these species have never been found outside of Missouri, and nine others have only a limited distribution in neighboring states. Ozark crayfish are distributed according to river basins, and species that are abundant and widespread in one basin are often absent from adjacent basins. Examples are the Neosho midget crayfish (*O. macrus*) in the Neosho (Spring-Elk) river basin, the woodland crayfish (*O. hylas*) in the Black River basin, and the saddlebacked crayfish (*O. medius*) in the Meramec River basin. More generally distributed species include the golden crayfish (*O. luteus*), the spothanded crayfish (*O. punctimanus*) and Hubbs' crayfish (*C. hubbsi*). Two species of blind, white crayfish are restricted to cave streams of the Missouri Ozarks. These are the bristly cave crayfish (*C. setosus*) of the western Ozarks and the Salem cave crayfish (*C. hubrichti*) of the eastern Ozarks.

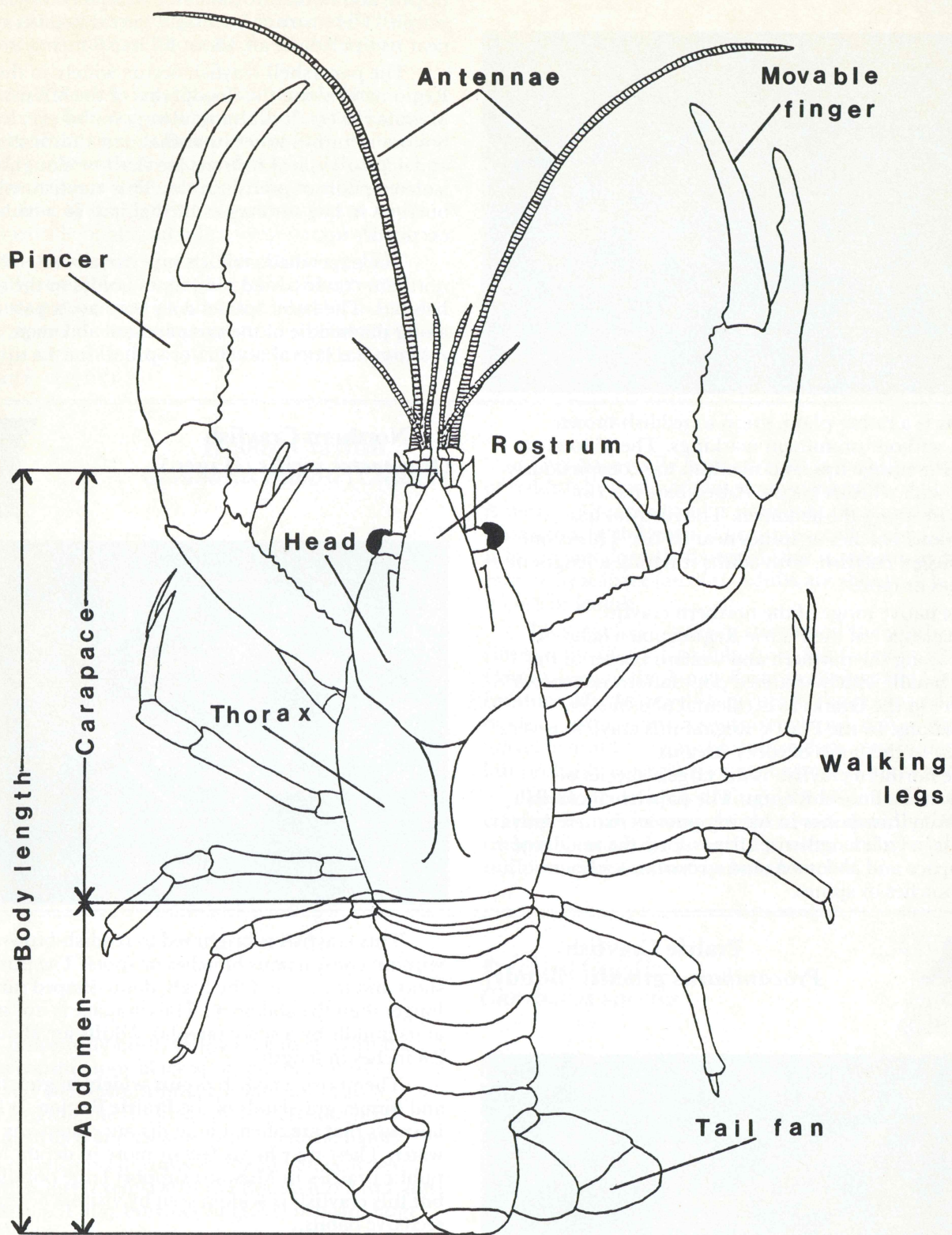
The **Lowland Region** is in southeastern Missouri. This region supports a distinctive assemblage of ten crayfish species. Most of these species inhabit swamps, sloughs and seasonally flooded areas. Although they occur much of the year in surface waters, they exhibit a strong tendency to burrow during the drier seasons. The red swamp crayfish (*P. clarkii*) and the White River crayfish (*P. acutus*) are the most common and generally distributed crayfish in these habitats. They occur also in lowland streams and ditches, where they are joined by another common species, the gray-speckled crayfish (*O. palmeri*). Other crayfish that occur at a few locations in the Lowlands are the one-inch dwarf crayfish (*C. shufeldtii* and *C. puer*), the slightly larger shield crayfish (*F. clypeata*) and the shrimp crayfish (*O. lancifer*).

The **Big River Region** includes the Missouri and Mississippi rivers. Many kinds of fish are characteristic of the channels of these streams, but crayfish occur only as small local populations or stray individuals. A four-inch shrimp (*Macrobrachium ohione*) was formerly abundant in the Mississippi River, but disappeared about 30 years ago. Several crayfish species characteristic of other regions are common in sloughs and marshes on the river floodplains. These include the White River crayfish (*P. acutus*) and dwarf crayfish (*C. shufeldtii*) along the Mississippi River, and the papershell crayfish (*O. immunis*) along the Missouri River. The devil crayfish (*C. diogenes*) is the common burrowing crayfish on floodplains of both rivers.

The harvest of crayfish for food in the United States now approaches 100 million pounds annually, with most of that coming from the state of Louisiana. This harvest consists almost entirely of the red swamp crayfish (*P. clarkii*) and the White River crayfish (*P. acutus*). In southern states the raising of these species involves filling and draining ponds on a yearly cycle. The ponds are drained in late spring to grow natural vegetation or crops such as rice that provide food for the crayfish when the ponds are refilled in the fall. The adults are in burrows during the dry part of the cycle, when the young are produced. The crayfish grow throughout the fall and winter period when the ponds are flooded, reaching a marketable size by early spring.

Different techniques and other species appear to be better suited for crayfish farming in Missouri. Since our winter temperatures are too low for crayfish growth, a management strategy is required that takes advantage of the late spring and summer growing season. Ponds are not drained on a regular basis, and a species is used that does not burrow. The northern crayfish (*O. virilis*) appears to be the species best suited to Missouri conditions. It does well in ponds and reaches a large size. The longpincered crayfish (*O. longidigitus*) is our largest native species, but its suitability for pond culture is unknown. The papershell crayfish (*O. immunis*) is very prolific in ponds, and is an excellent bait species.

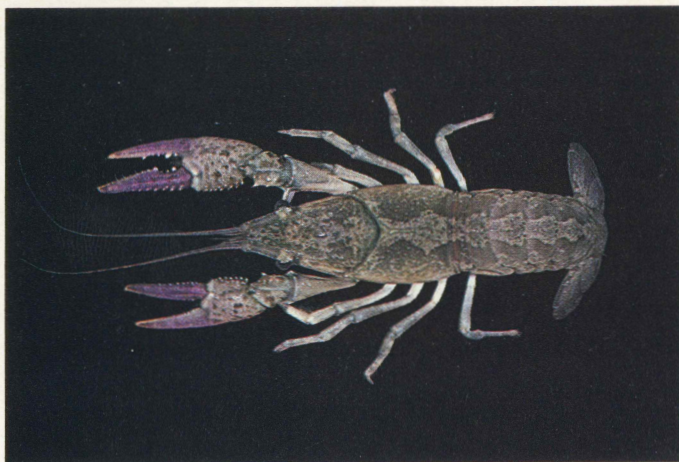
Use of this article for identifying Missouri crayfish requires familiarity with a few structures not found in more familiar animals. Most of these structures are illustrated in the accompanying diagram. The length measurement used to indicate crayfish size is the distance from the tip of the rostrum to the tip of the tail fan. The gonopods of male crayfish extend forward on the underside of the thorax between the bases of the legs. The length and shape of the tips on these paired structures are sometimes quite different in crayfish that otherwise look quite similar. The areola is an hourglass-shaped area set off by shallow, lengthwise grooves on the middle of the carapace. When the grooves touch for part of their length, the areola is said to be absent. These and other structures mentioned in the crayfish descriptions can generally be seen by the unaided eye or with a lowpower hand lens.



Anatomy of a Crayfish



### Papershell Crayfish *Orconectes immunis* (Hagen)



This is a rather plain, green to reddish-brown crayfish without prominent markings. The pincers are green with orange tips, and in adults are conspicuously studded with whitish knobs. Paired blotches run lengthwise along the abdomen. The rostrum has conspicuous notches or spines near its tip. This is one of our largest crayfish, with adults reaching a length of 4.8 inches or more.

The native range of the northern crayfish encompasses all of the Prairie Region and a band of streams along the northern and western border of the Ozarks. Small, widely scattered populations now occur elsewhere in the Ozarks as accidental bait-bucket introductions. In the Prairie Region this crayfish is very abundant in the pools of rocky streams.

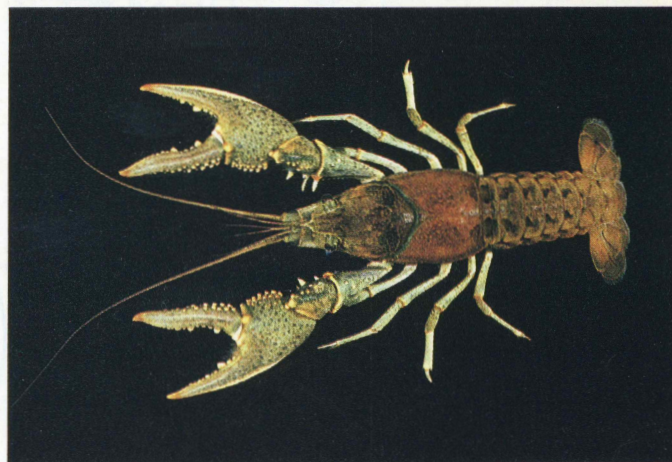
The northern crayfish is the largest species of crayfish in the Prairie Region. The papershell crayfish differs from this species in having pincers that are gray or purple, a pale lengthwise stripe along the middle of the carapace and abdomen, and a rostrum without lateral notches or spines.

This rather plain, gray-green crayfish is characterized by a pale central zone along the middle of the carapace and abdomen. The pincers are orange-tipped, and in mature males are uniquely tinged with purple. The rostrum is without lateral notches or spines near its tip. Adults are about 1.7 to 3.5 inches in length.

The papershell crayfish occurs widely in the Prairie Region and along the floodplains of the Mississippi and Missouri rivers. It is almost always found over a mud bottom in turbid waters that fluctuate drastically in area and depth. Typical habitats are shallow sloughs and the isolated pools of prairie creeks. This crayfish retreats to burrows in late summer as the habitats in which it occurs dry up.

The papershell crayfish superficially resembles the northern crayfish, and sometimes occurs in the same habitats. The latter species does not have a pale zone along the middle of the carapace and abdomen, and the rostrum has lateral notches or spines near its tip.

### Northern Crayfish *Orconectes virilis* (Hagen)



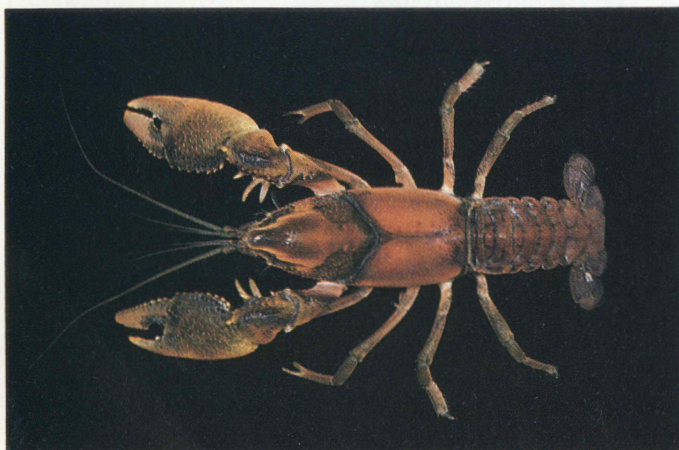
This crayfish is bright red to reddish-brown, without conspicuous blotches or spots. The pincers are short and heavy, and the high, dome-shaped carapace is longer than the abdomen. The carapace is not separated at its middle by a space (areola). Adults are about 2.1 to 2.8 inches in length.

The prairie crayfish occurs widely in grasslands and former grasslands of the Prairie Region. It lives in burrows that are often a long distance from any surface water. These may be six feet or more in depth. Most public prairies in Missouri support large populations, but this crayfish is seldom seen by visitors because of its secretive habits.

The prairie crayfish superficially resembles the devil crayfish, another burrowing species. The devil crayfish is never a uniform bright red, as are many adult prairie crayfish. Males of the two species are readily separated by the shape of the gonopod tips (nearly straight in the prairie crayfish, strongly curved in the devil crayfish).



### Prairie Crayfish *Procambarus gracilis* (Bundy)

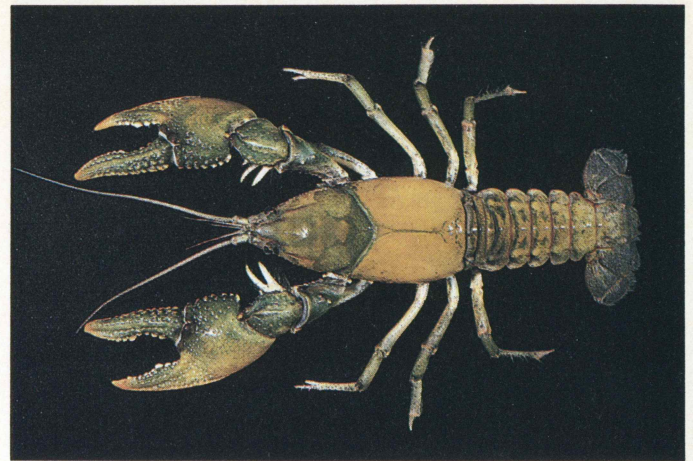


This powerfully built crayfish is usually a uniform olive or tan, without obvious blotches or spots. Occasional individuals are blue, with yellowish stripes on the abdomen and bright red outlining many body parts. The carapace is not separated at its middle by a space (areola). Adults are about 3.2 to 4.5 inches in length.

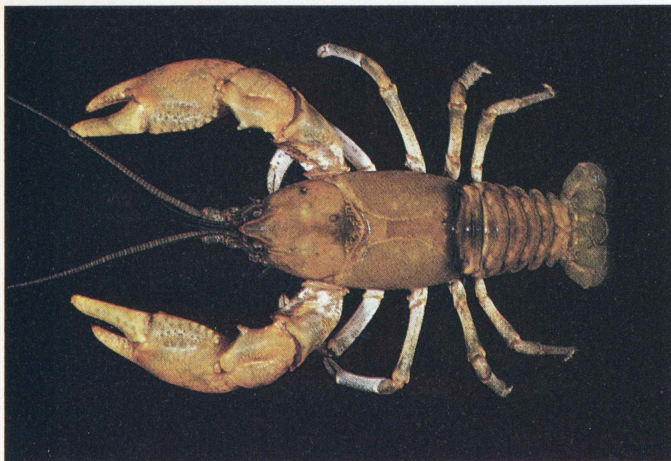
The devil crayfish is perhaps our most widely distributed crayfish, occurring over all except the west-central part of the state. It lives in burrows in timbered or formerly timbered areas along the floodplains of streams. Its presence is often revealed by conspicuous mud chimneys. In early spring, young and some adults occur in roadside pools and other temporary waters.

Another burrowing species, the prairie crayfish, superficially resembles the devil crayfish. However, adults of the prairie crayfish are often bright red. In males the tips of the reproductive structures (gonopods) are strongly curved in the devil crayfish, nearly straight in the prairie crayfish.

### Devil Crayfish *Cambarus diogenes* (Girard)



### Hubbs' Crayfish *Cambarus hubbsi* (Creaser)



This powerfully built crayfish is usually olive-tan or reddish brown, without prominent spots or blotches. A narrow blackish band is present at the junction of the carapace and abdomen. The carapace of Hubbs' crayfish is broad and dorsally flattened, and is separated at its middle by a space (areola). Adults are about 1.7 to 3.6 inches in length.

This crayfish occurs in streams on the southern slope of the Ozark Uplands, from Big Creek in Iron County west to the James River in Greene and Christian counties. Hubbs' crayfish occurs in the pools and riffles of clear, permanent streams, in burrows that it digs in gravel beneath large rocks. It is seldom seen in the open, but probably emerges from its burrow at night to feed.

Hubbs' crayfish is distinguished from other stream crayfish within its range by the broad, dorsally flattened carapace, unusually powerful pincers, and nearly uniform color without spots or blotches.

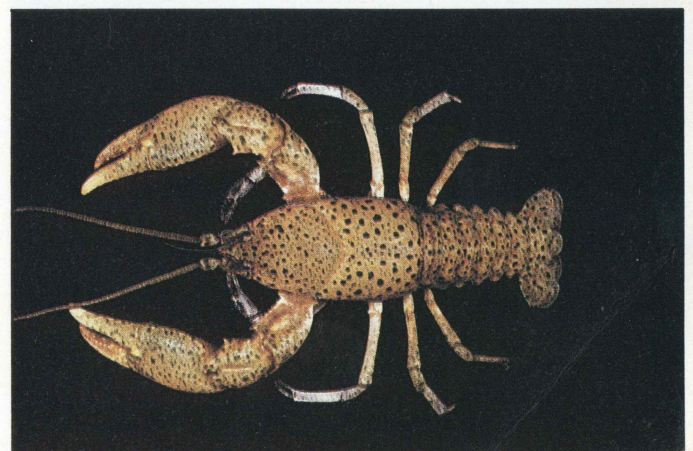
### Freckled Crayfish *Cambarus* species



This powerfully built, yellowish-tan crayfish has numerous conspicuous black spots on its pincers, carapace and abdomen. Adults are about 1.9 to 3.3 inches in length. The freckled crayfish has not been formally described and lacks a valid scientific name.

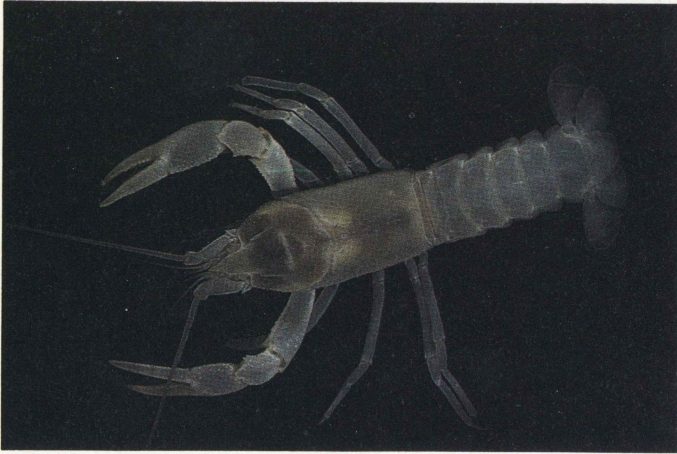
This crayfish occurs only in the Meramec River basin of Missouri (exclusive of the Bourbeuse River and its tributaries). It digs burrows in gravel beneath large rocks, and probably emerges at night to feed.

The freckled crayfish is distinguished from all other species within its range by the pattern of conspicuous black spots over the entire dorsal surface.





### Salem Cave Crayfish *Cambarus hubrichti* (Hobbs)



This crayfish is one of two (possibly three) blind, white (translucent) species that occur in subterranean waters of the Missouri Ozarks. Like the other cave crayfish, this species has long, narrow pincers and very long antennae. The carapace is separated at its middle by a wide space (areola) in the Salem cave crayfish. Adults are about 2.2 to 2.8 inches in length.

This crayfish occurs only in Missouri, in a broad area of the eastern Ozarks from Camden and Crawford counties southward to Oregon and Ripley counties. It is most often found in cave streams, and is sometimes collected at the mouths of springs.

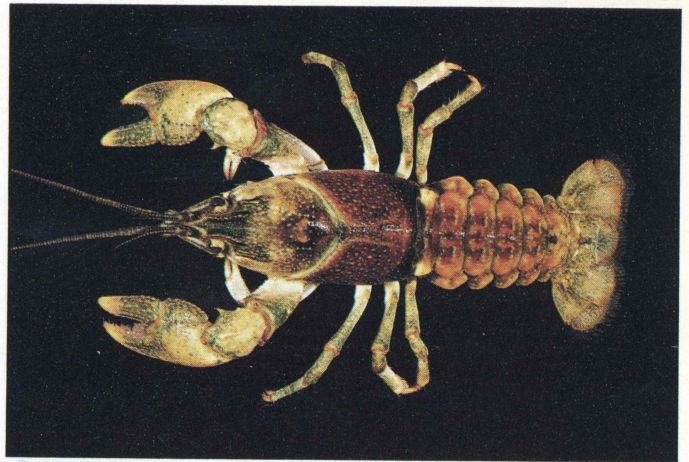
The bristly cave crayfish (*Cambarus setosus*) occurs in the southwestern Ozarks. It differs from the Salem cave crayfish in having longer and more conspicuous bristles (setae) on the pincers. Also, the areola is very narrow or absent in the bristly cave crayfish.

This medium-small, stout crayfish has a blue-green head and pincers, and a dark rust-brown carapace. The abdomen has a pair of conspicuous white lateral spots on the first segment, and a tapering V-shaped dark central stripe. Adults are about 1.2 to 2.8 inches in length.

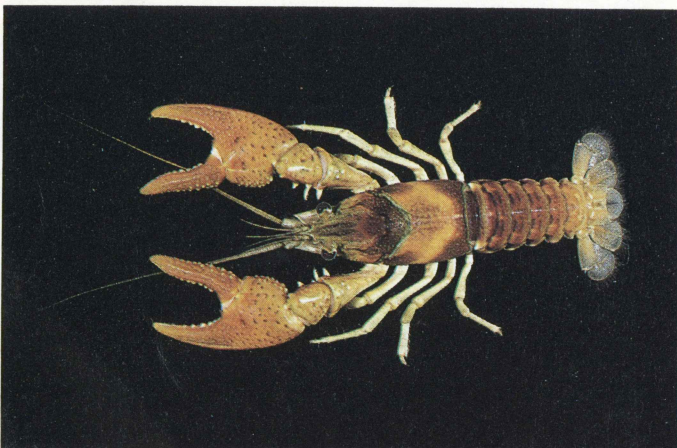
The coldwater crayfish has a very localized distribution in the Eleven Point River and Spring River of southern Missouri and Arkansas. These clear, cold rivers are fed by two of the largest Ozark springs (Greer and Mammoth). In the Eleven Point River and Greer Spring Branch this is the most abundant crayfish. It occurs over gravel substrate in swift current.

This crayfish is distinguished from other crayfish within its range by the distinctive red and green color and V-shaped central stripe on the abdomen.

### Coldwater Crayfish *Orconectes eupunctus* (Williams)



### Mammoth Spring Crayfish *Orconectes marchandi* (Hobbs)



This is a reddish-brown crayfish with broad, powerful pincers. The pincers have numerous blackish specks on their basal parts. The abdomen is dark rust-red without specks. The carapace is light tan, with a dark brown band crossing the back of the head and another at the junction of the carapace and abdomen. Adults are about 1.4 to 2.4 inches in length.

The Mammoth Spring crayfish has a very localized distribution near Mammoth Spring in the Spring River of Arkansas and Missouri. In our state it has been collected only from Warm Fork of Spring River near Thayer.

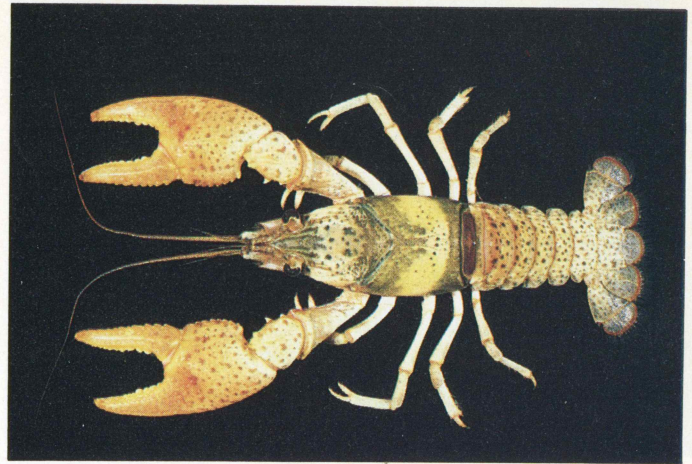
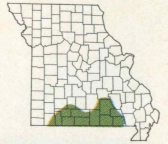
This crayfish bears a striking resemblance to the Ozark crayfish, and both species occur in the Warm Fork. Males of the two species are easily distinguished by the shape of the reproductive structures (gonopods). The gonopod tips are long and slender in the Ozark crayfish, short and blunt in the Mammoth Spring crayfish. The Ozark crayfish is lighter tan and less reddish, especially on the pincers.

This is a rather plain, light brown to reddish-brown crayfish with numerous black specks on the pincers, and often on the abdomen as well. The pincers are broad and powerful. Adults are about 1 to 3.4 inches in length.

The Ozark crayfish occurs widely in the southern Ozarks, from Roaring River and Flat Creek in Barry County eastward to the Little Black River in Ripley County. It seems to be absent from the North Fork and Bryant Creek.

Common, superficially similar species within the range of this crayfish are the golden crayfish and the ringed crayfish. Both of these species lack conspicuous blackish specks on the pincers and abdomen, and the ringed crayfish has prominent brown or black rings on the fingers near their tips.

### Ozark Crayfish *Orconectes ozarkae* (Williams)

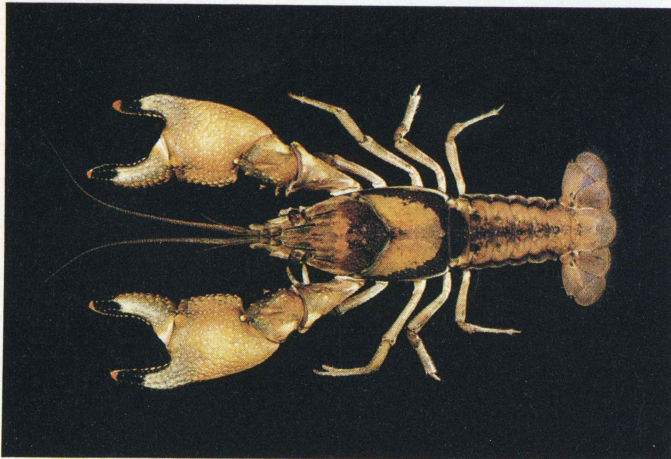


This is a medium-sized olive-green to reddish-tan crayfish with prominent black or brown rings around the fingers of its pincers near their tips. The pincers are often very broad and heavy (especially in males), with a broad gape between the fingers when they are closed. A dark band crosses the carapace near its junction with the abdomen. A pair of dark stripes run lengthwise along the abdomen near its lateral margins. Adults are about 1.6 to 3.6 inches in length.

This is the most abundant crayfish in streams of the White and Neosho basins. Two subspecies are recognized, *O. n. neglectus* in the Neosho basin, and *O. n. chaenodactylus* in the White River basin. This crayfish burrows in gravel beneath large rocks.

No other crayfish within the range of this species has conspicuous black rings on the fingers. The Ozark crayfish is about the same size and build, but it has numerous dark specks on the abdomen and pincers.

### Ringed Crayfish *Orconectes neglectus*

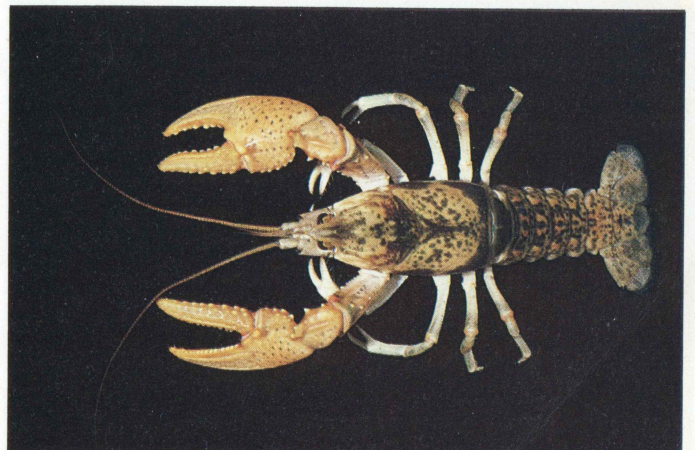


This is a stout, reddish-tan to dark brown crayfish with numerous blackish specks and blotches on the pincers, carapace and abdomen. A narrow crescent-shaped dark band extends across the carapace at its junction with the abdomen. A pair of whitish spots occur laterally on the first abdominal segment. Adults are about 1 to 2.6 inches in length.

The woodland crayfish occurs only in Missouri. It is the most abundant and generally distributed crayfish in Black River and its tributaries, and occurs sparingly in headwaters of Big River. It has been introduced into Stouts Creek in Iron County. This crayfish occupies burrows it digs beneath rocks in clear, permanent streams.

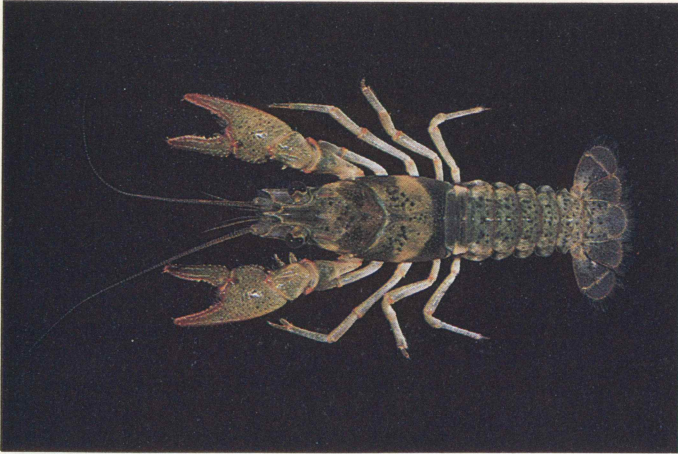
The woodland crayfish is easily distinguished from other similar species within its range by its brown coloration and blotched and speckled color pattern. It somewhat resembles the Ozark crayfish, but the two species do not occur in the same river basins.

### Woodland Crayfish *Orconectes hylas*





### St. Francis River Crayfish *Orconectes quadruncus* (Creaser)



This is a moderately small, brown crayfish without bright colors. Blackish specks and blotches occur over the dorsal surface of the body and pincers (specks most numerous on abdomen). The pincers are moderately broad and heavy. Adults are about 1 to 2.2 inches in length.

The Big Creek crayfish has a very localized distribution which is centered in Big Creek and its tributaries on the west side of the St. Francis River basin. Other populations occur in Clark Creek and Twelve Mile Creek, direct tributaries of the St. Francis River. It lives in burrows dug in gravelly substrate beneath rocks.

The only other small brown crayfish native to the St. Francis River basin is the St. Francis River crayfish. The two species are readily separated by the shape of the male reproductive structures (gonopods), which are long and slender in the Big Creek crayfish, short and blunt in the St. Francis River crayfish. The two species have not been found at the same locality.

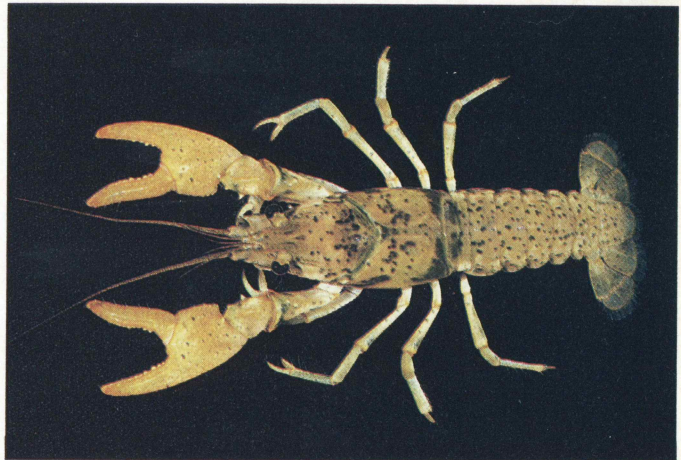
This medium-small crayfish is brown, with blackish blotches and specks on the dorsal surface of the pincers and body (specks most numerous on abdomen). The pincers are often trimmed with red, and thickly set hairs (setae) are present in the gape at the base of the fingers. Adults of this rather small crayfish are about 1.2 to 2.4 inches in length.

The St. Francis River crayfish occurs only in Missouri, in the St. Francis River and its tributaries (exclusive of Big Creek and other streams supporting populations of the Big Creek crayfish). It lives in burrows dug in gravelly substrate beneath rocks.

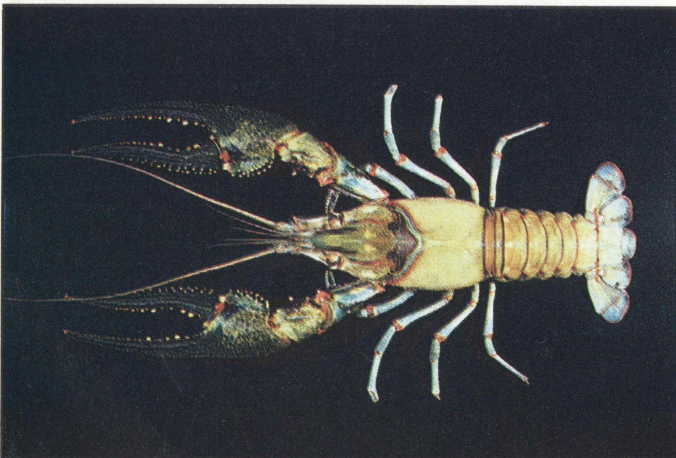
The only other small brown crayfish within the general range of this species is the Big Creek crayfish. The two species cannot be separated with confidence without comparing the male reproductive structures (short and blunt in the St. Francis River crayfish; long and slender in the Big Creek crayfish). The two species have not been found in the same stream.



### Big Creek Crayfish *Orconectes peruncus* (Creaser)



### Longpincer Crayfish *Orconectes longidigitus* (Faxon)



This large, colorful crayfish is characterized by very long, slender blue-green pincers that are studded with prominent yellowish knobs. The carapace and abdomen are olive-tan trimmed with bright red. This is our largest native crayfish, with adults achieving a length of 6 inches or more. It reaches maturity at a length of about 3.5 inches.

The longpincer crayfish occurs only in the White River basin of southern Missouri and northern Arkansas. It lives in the pools of Ozark streams along bluffs where large slabs of rock provide numerous crevices in which it spends the daylight hours. At night it emerges to forage over the stream bottom. Substantial populations of this species also occur in Table Rock Lake.

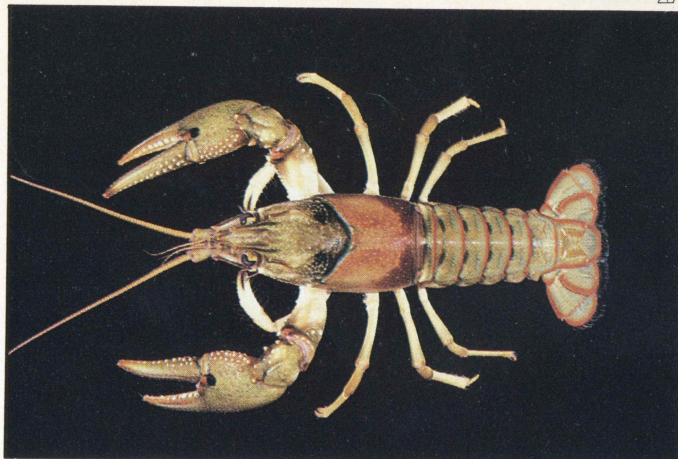
The long, blue-green pincers and large size distinguish this crayfish from other species within its range. The superficially similar spothanded crayfish has a conspicuous spot on each pincer at the base of the movable finger.

The most distinctive feature of this moderately large crayfish is the presence of a conspicuous black spot on each pincer near the base of the movable finger. The carapace is reddish brown or olive-brown, with a narrow crescent-shaped dark bar across its hind margin. The abdomen is olive-green, with bright red outlining the free margins of all its segments. The pincers, carapace and abdomen are without conspicuous dark specks or blotches. Adults are about 1.3 to 4.4 inches in length.

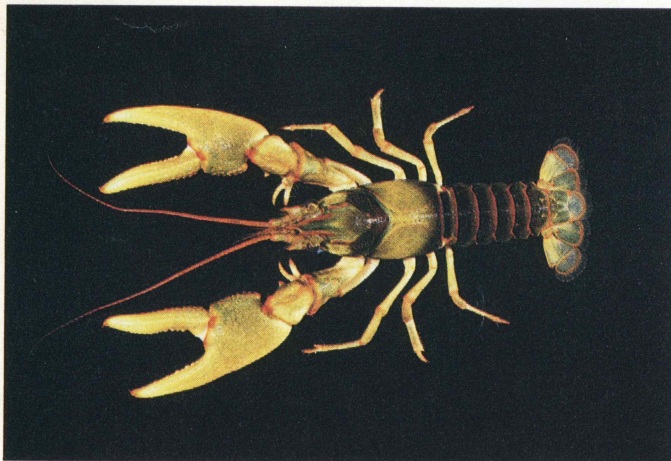
This crayfish occurs only in the Ozark Region of Missouri and Arkansas. It occurs in all principal drainages except the Osage and Neosho (Spring-Elk). In the White River basin it is confined to the North Fork and Bryant Creek. This crayfish occurs in clear, permanent-flowing streams, in backwaters and along the margins of pools.

The conspicuous black spot on each pincer readily distinguishes the spothanded crayfish from other species within its range.

### Spothanded Crayfish *Orconectes punctimanus* (Creaser)



### Golden Crayfish *Orconectes luteus* (Creaser)

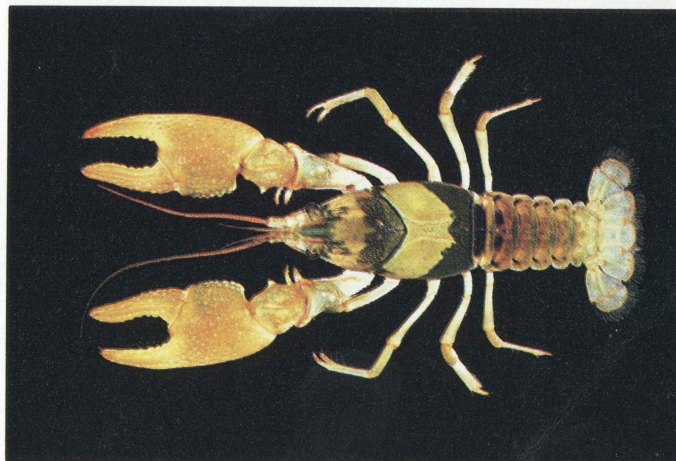


This wide-ranging species is quite variable in color, but is typically olive-green suffused with golden yellow. The antennae and many body parts are trimmed with bright red. A dark band crosses the head just in front of the cervical groove, and another crosses the carapace at its junction with the abdomen. The tips of the fingers are red, bordered in some populations by conspicuous black bands. Adults of this moderately large crayfish are about 1 to 3.4 inches in length.

The golden crayfish is one of the most abundant and widely distributed crayfish in our state, occurring throughout the northern Ozarks, in Current River, and in prairie streams of northeastern Missouri. It lives in streams with permanent flow, over rocky bottoms and in beds of emergent aquatic plants.

This crayfish is distinguished from most other crayfish within its range by its olive-green and red coloration without conspicuous blotches or spots.

### Saddlebacked Crayfish *Orconectes medius* (Faxon)



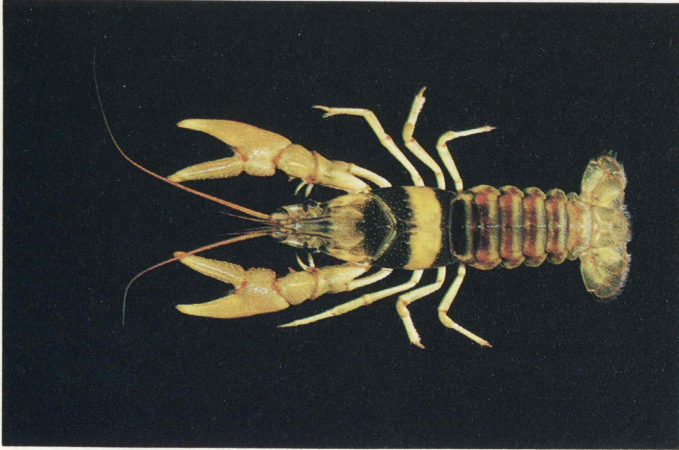
The most obvious features of this crayfish are the bold blackish band (saddle mark) across the hind margin of the carapace, and the absence of dark blotches or specks. Another bar crosses the head just in front of the cervical groove (groove separating head from thorax). The pincers are broad and powerful. Adults are about 1.4 to 2.6 inches in length.

The saddlebacked crayfish occurs only in the Ozark Region of Missouri, where it is found in the Meramec River and Big River drainages. In many small streams of that region it is the most abundant crayfish. This crayfish digs shallow burrows beneath rocks.

Similar species within the range of this species are the golden crayfish, which has a darker abdomen and red on many body parts, and the Big River crayfish, in which the anterior saddle spans the cervical groove.



### Big River Crayfish *Orconectes harrisoni* (Faxon)



This medium-small, tan-colored crayfish has a distinctive pattern of alternating olive-green and reddish-brown bands on the abdominal segments. Another unique feature is the presence on the carapace of a broad, blackish band that spans the cervical groove (groove separating head and thorax). The pincers are narrow for a stream crayfish but are not especially long. Adults are about 1.4 to 2.4 inches in length.

The Big River crayfish occurs only in Missouri, in Big River and its tributaries of the eastern Ozarks. It inhabits clear, permanent streams over a substrate of coarse rock.

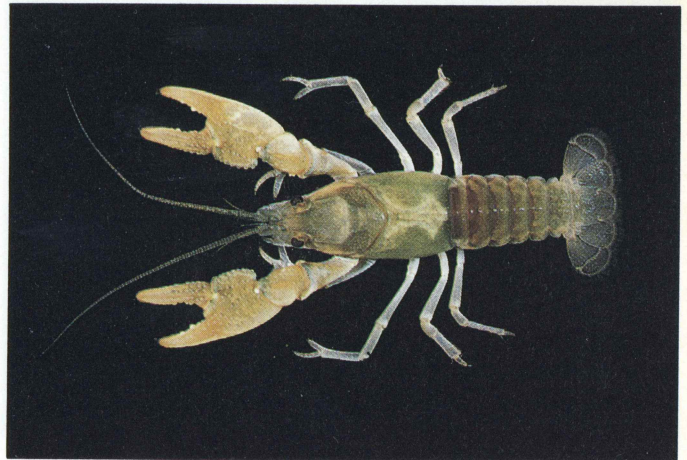
Other similar crayfish within the range of the Big River crayfish are the golden crayfish and saddlebacked crayfish. They are readily distinguished from the Big River crayfish because the dark band crossing the head is entirely in front of the cervical groove.

This is a small, rather plain crayfish without bright colors or bold markings. Its most distinctive feature is a pale, vase-shaped zone along the middle of the dark olive-tan carapace. The pincers are broad and powerful. Adults are about 1.3 to 2 inches in length.

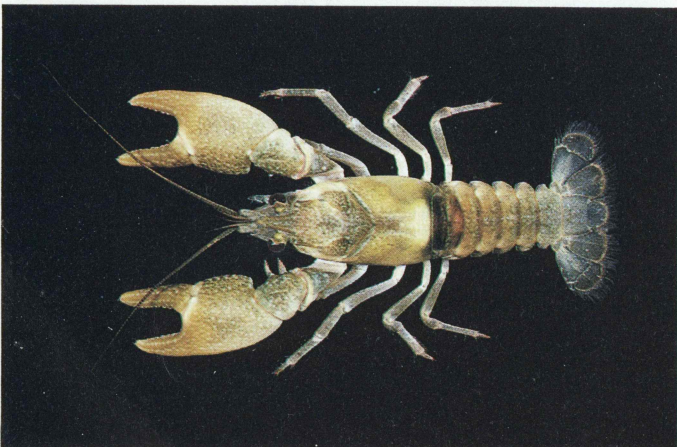
Meek's crayfish occurs widely in the White River basin of Arkansas, and has been recorded in Roaring River and a few other streams of southern Barry, Stone and Taney counties. It lives in burrows in gravelly and sandy substrate beneath rocks.

Similar species within the range of Meek's crayfish are the Ozark crayfish, which has numerous dark specks on the pincers and abdomen, and the ringed crayfish, which has prominent black or brown rings near the tips of the fingers. These species reach a larger size than Meek's crayfish.

### Meek's Crayfish *Orconectes meeki* (Faxon)



### Neosho Midget Crayfish *Orconectes macrus* (Williams)



This small crayfish is a subdued mottled brown, with a prominent black band crossing the carapace near its junction with the abdomen. The body is stout, and the pincers are broad and powerful. Adults are about 0.9 to 2 inches in length.

The Neosho midget crayfish has a very localized distribution in the Spring and Elk river systems of the southeastern Ozarks. In this area it is one of the most abundant crayfish. It lives in short burrows that it digs in the bottoms of gravelly riffles.

This is the only small brown crayfish that occurs in the Spring and Elk stream systems. Other species in these drainages achieve a larger size, are more greenish, and have conspicuous black rings or whitish tubercles on their pincers.

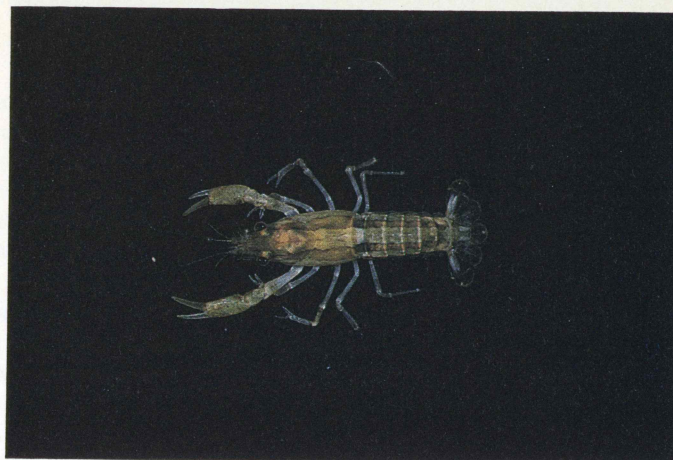
The dwarf crayfish are appropriately named; adults range in length from 0.8 to 1.3 inches. The two species can be distinguished by examining the male reproductive structures, which are straight in *C. shufeldtii* and curved in *C. puer*. Both are reddish brown to gray, with a paired series of dark, wavy stripes or dashed lines along the dorsal surface. The tail fan usually has a dark central blotch. The pincers are narrow and long.

These small crayfish occur sporadically throughout the Lowlands, and *C. shufeldtii* occurs on the floodplain of the Upper Mississippi River. They are found in shallow, temporary pools during wet seasons, retreating to cells they dig in mud or moist soil during periods of drought.

The dwarf crayfish can be distinguished from the young of other Lowland crayfish by the conspicuous dark pigment in the tail fan, and the lengthwise dark stripes or lines on the carapace. Also, the rostrum is flat, without a central troughlike depression.

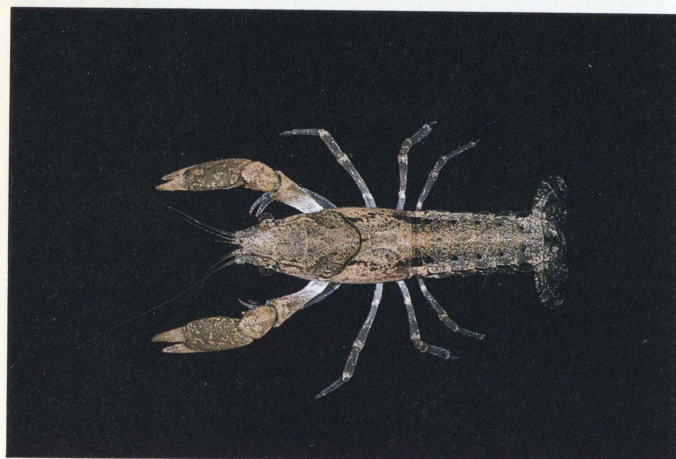
### Dwarf Crayfish

*Cambarellus shufeldtii* (Faxon)  
*Cambarellus puer* (Hobbs)



### Shield Crayfish

*Faxonella clypeata* (Hay)



This small, tan crayfish has a pattern of paired blackish dashes along the surface of the carapace and abdomen. The pincers are narrow and cylindrical, with short, abruptly tapering fingers. The rostrum is broad, and without lateral spines or notches. The reproductive structures (gonopods) of males have long, slender tips, and the right and left tips cross each other diagonally. The areola (space in the middle of carapace) is very broad. Adults are about 1.1. to 2 inches in length.

The shield crayfish occurs at scattered localities in the Lowlands of southeastern Missouri. Specimens are collected in winter and early spring from intermittent creeks and seasonally flooded sloughs and swamps. This species retreats to burrows as water levels recede.

Most other small crayfish found within the range of the shield crayfish (dwarf crayfish and the young of other species) have a narrower rostrum, with lateral spines or notches near its tip. Many have the areola narrow or absent.

This medium-small crayfish is light reddish brown to gray, thickly dusted with darker specks. It is characterized by an unusually long rostrum, with the tip (acumen) longer than the base. The carapace is not separated at its middle by a space (areola). The pincers are narrow and weak. Adults are about 2 to 3 inches in length.

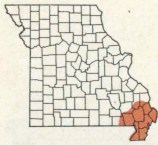
The shrimp crayfish has been collected in Missouri only from the lower St. Francis River and Wolf Bayou. It occurs in the deep, permanent waters of lowland rivers and oxbows, and has been taken from among tree roots and other cover along the banks.

The color pattern, shape of the rostrum, and absence of an areola will distinguish this crayfish from other species within its range. The gray-speckled crayfish is somewhat similar in appearance, but has heavier pincers and a shorter rostrum.

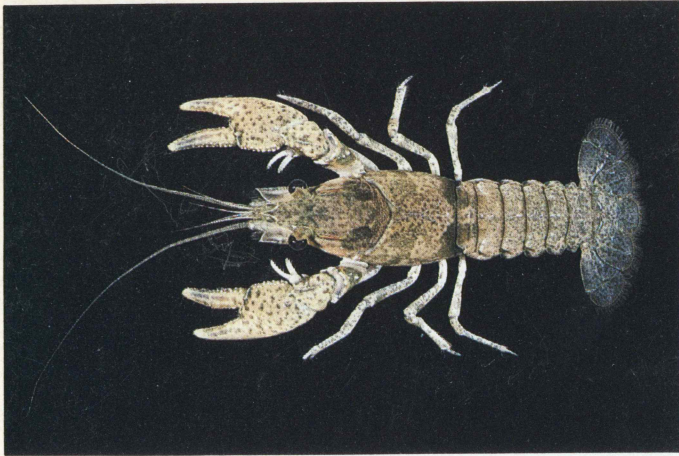
### Shrimp Crayfish

*Orconectes lancifer* (Hagen)





### Gray-Speckled Crayfish *Orconectes palmeri* (Faxon)



This crayfish is gray with numerous greenish-black speckles and blotches on the pincers, carapace and abdomen. A pair of large blotches are present near the back of the head, and another pair occur near the junction of the carapace and abdomen. The fingers often have conspicuous cream-yellow tips. The carapace is not separated at its middle by a space (areola). Adults are about 1.4 to 2.6 inches in length.

This crayfish occurs widely in the Lowlands of southeastern Missouri and penetrates into adjacent sections of the Ozarks along the major streams. It is restricted to permanent-flowing waters, occurring among tree roots and organic debris, and beneath roots.

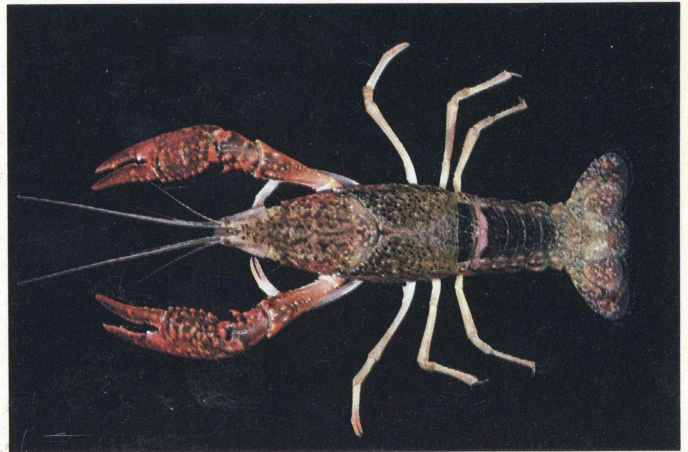
The gray-speckled crayfish is the only common *Orconectes* in the Lowlands. Other typical crayfish of the region have longer, more slender pincers, and none have the pattern of dark paired blotches described above.

Adults of this species are colored dark red (nearly black on the carapace), and have a wedge-shaped black stripe on the abdomen. Juveniles are a uniform gray, sometimes overlain by dark wavy lines. The pincers are narrow and long. The carapace is not separated at the middle by a space (areola). The carapace is conspicuously granular (roughened) in adults. The rostrum has lateral spines or notches near its tip. Adults are about 2.2 to 4.7 inches in length.

The red swamp crayfish is the most abundant large crayfish in many swamps, sloughs and sluggish ditches of the Lowlands. It generally avoids streams and ditches with strong flow, where it is replaced by the White River crayfish. The red swamp crayfish burrows during periods of drought or cold.

This crayfish most closely resembles the White River crayfish, which differs most obviously in having an areola. Young of the White River crayfish usually have spots on the carapace.

### Red Swamp Crayfish *Procambarus clarkii* (Girard)



Adults of this species are usually a deep burgundy red with a black V-shaped stripe on the abdomen. Juveniles are gray with dark spots scattered over the carapace. The pincers are long and narrow. The carapace is separated at its middle by a space (areola). The carapace is conspicuously granular (roughened) in adults. Adults are about 2.6 to 4.1 inches in length.

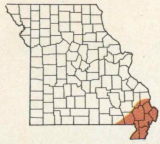
This crayfish occurs commonly in the Lowlands of southeastern Missouri, and northward along the floodplain of the Mississippi River to Clark County. It inhabits sloughs, swamps and sluggish lowland streams and ditches. It frequently burrows to escape drying or freezing.

The White River crayfish resembles the red swamp crayfish. The latter species differs most notably in lacking an areola. Young of the red swamp crayfish are usually plain or striped, not spotted.

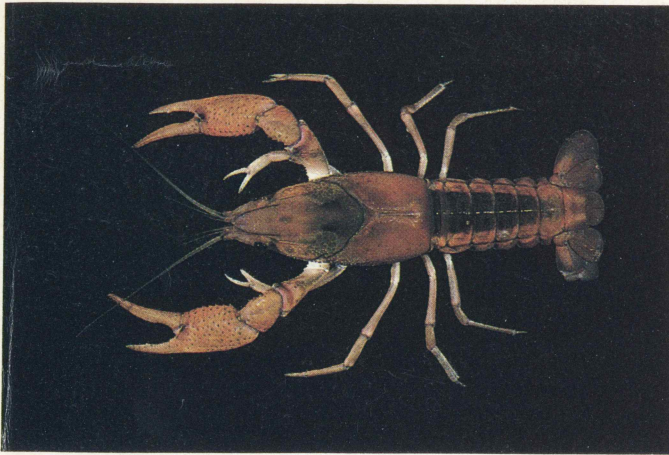


### White River Crayfish *Procambarus acutus* (Girard)





**Vernal Crayfish**  
*Procambarus viaeviridus* (Faxon)



Adults of this crayfish are rust-red with a blackish wedge-shaped central stripe along the length of the abdomen. The carapace is smooth, and is separated at the middle by a narrow space (areola). The rostrum is broad and without lateral notches or spines near its tip. The pincers are moderately long and slender. Adults are about 1.8 to 3 inches in length.

The vernal crayfish occurs in the Lowlands of southeastern Missouri. In late winter and spring when water levels are high, this crayfish is found in temporarily flooded sloughs and other depressions. As water levels recede in late spring and early summer, it retreats into burrows, not to be seen again until the next wet-weather period.

Other similar crayfish within the range of the species are the red swamp crayfish and the White River crayfish. These species have a narrower rostrum (often with lateral spines) and a granular (roughened) carapace.

# The Incredible Edible Crawdad

*The “fresh-water lobsters” of Missouri streams have as much flavor and nutrition as their sea-going cousins.*

by Kathy Love  
 Conservationist Staff



Joel Vance

**Crayfish, crawfish, crawdad**—they all mean good eating to adventuresome outdoor gourmets. Crayfish are first cousins to the highest of American *haute cuisine*, the lobster. Prepared in a similar manner, and in as wide a range of dishes—from Cajun to Yankee—crayfish can be substituted for lobster in many recipes.

Nutritionally, they contain the same amount of protein as their sea-going cousin, and more phosphorous than any other fish flesh. Since a large

part of the diet of crayfish consists of carrion and vegetable matter, it is essential that crawdads caught for human consumption come from pollution-free water.

There are over 500 species of crayfish worldwide, ranging in size from the American dwarf crayfish, found in Missouri, which grows only up to 1.3 inches in length, to the Tasmanian crayfish, which grows up to eight pounds.

Crayfish flourish in waters 55 to 60 degrees F. They

shed their exoskeletons in proportion to their rate of growth, as often as three or four times a year. The average life expectancy for a crawdad is about three years, but the "granddaddies" may live to be seven or eight.

Pacific Search Press publishes *The Crawfish Cookbook* which features crayfish recipes like Crawfish Quiche, Crawfish Stuffed Peppers, and even Crawfish Pizza and Crawfish Tacos. The champion crawfish eater of Louisiana, they report, is said to have consumed 30 pounds of crayfish, liveweight. That figures out to about five pounds of cooked crayfish meat.

The amount of crayfish needed for a serving varies according to the size and variety captured. As a general rule only, 12 medium-sized crayfish (six to seven inches long) are sufficient for one serving; one pound of crayfish, liveweight, is equal to one cup of meat, using tails and claws; and one cup of crayfish meat will usually serve from two to six, depending on the recipe and amount of other ingredients.

Cooking times also follow very general rules; some directions, like *Cy Littlebee's Guide to Cooking Fish and Game*, call for boiling up to an hour, while others suggest as little as five minutes for a small amount. A good general rule is to cook crayfish until they are bright red.

Now comes the hard part—removing the tail meat from the shell and the dark vein, or alimentary canal, from the tail meat. Crawdad connoisseur Jim Auckley recommends using the pointed end of a "church key" can-opener to strip out the vein, but fingernails are also known to work.

Because crayfish, like all fish, are highly perishable, it's good to follow three rules when preparing them: use only live, freshly-caught crayfish from clean water; kill instantly by dropping into boiling water; and keep them chilled until used. *Cy Littlebee* also recommends soaking in salt water before cooking as an extra cleansing measure.

As anyone who has caught, cooked and prepared a crawfish meal will tell you, it takes a lot of labor for a small amount of meat, but the taste (especially after a

long afternoon on the river) is worth it.

To guard against overharvest of crayfish, never take all your crayfish from the same location before the end of May, when breeding is still going on. The Department of Conservation has set a daily possession limit of 150 crayfish.

The Louisiana Wildlife and Fisheries Commission provided the following recipes:

### Crayfish Etouffee

2½ lbs. crayfish tails  
1 stick margarine  
3 large onions, finely chopped parsley  
salt and pepper to taste

Saute onions in margarine about 15 or 20 minutes until soft. Add crayfish fat (from the body cavity) and cook over low heat, stirring constantly, until fat comes to the top. Add tail meat and season to taste. Add just enough hot water to etouffee for desired consistency. Simmer for 20 minutes. Add parsley. Serve over steaming hot rice. Serves 5 to 6.

### Crayfish Salad

2 cups boiled crayfish meat, diced  
1 cup celery, chopped  
2 hard-cooked eggs, chopped  
2 T. dill pickles, chopped  
½ t. worcestershire sauce  
mayonnaise  
salt and pepper

Combine all ingredients thoroughly and mix with mayonnaise to desired consistency. Season to taste. Serve on bed of shredded lettuce. Serves 4.

### Crawdad Pilaf

2 cups cooked rice  
½ cup stuffed olives, sliced  
1 small onion, chopped  
1 medium green pepper, chopped  
½ cup grated cheddar cheese  
3 cups cooked crayfish meat  
4 T. flour  
2 cups milk  
3 T. melted butter

Combine rice, olives, onion, green pepper, crayfish meat and most of the grated cheese together in a well-greased casserole. Make a medium white sauce of flour, butter and milk, and season to taste. Pour over casserole and sprinkle with remaining cheese. Bake at 350° for about 30 minutes or until top is brown. Serves 6. Δ

*It takes a heap of crayfish to make a meal, but remember there is a possession limit of 150 per day. And don't take all your "dads" from the same hole, especially during spring breeding.*

Joel Vance

